form including all of the limitations of the base claim and any intervening claims".

Responsive to the Examiner, Applicant requests reconsideration of the Examiner's determination that claim 3 depends upon a rejected base claim for the reasons set forth below. It is respectfully submitted that Applicant's explanation below, place claim 3 in condition for allowance. Thus, the Applicant believes that claim 3 is now in allowable form.

## II. ELECTION/RESTRICTION

The Examiner indicated that the claims 4-26 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected embodiment, there being no allowable generic or linking claim. "Election was made without traverse in Paper No. 6".

Responsive to the Examiner, Applicant again reasserts as in Paper No. 6 that Applicant respectfully reserves the rights to file continuation application(s) to prosecution any of the withdrawn claims. Additionally, if and when a generic claim is ultimately deemed to be allowable in the present application, Applicant respectfully requests that any of the withdrawn claims that depend from such allowed generic claim be deemed allowable as well.

## III. REJECTION OF CLAIMS 1-2 AND 27-30 UNDER 35 U.S.C. § 102

The Examiner rejected in Paragraphs 5-6 of the Office Action claims 1-2, and 27-30 under 35 U.S.C. §102(e) as being anticipated by Lee et al. (US Patent 5,748,789, issued May 5, 1998). The rejection is respectfully traversed.

Specifically, the Examiner broadly alleged that "Lee et al., in Figures 3, 9-11, 16, 20, 35 and 41-43 discloses the same apparatus and method for coding an input object as specified in

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claims 1, 2 and 27-30 of Applicant's invention". Applicant respectfully disagrees.

Lee et al. teaches a block skipping method. Specifically, Lee states that "the method of the invention reduces coding overhead and the number of bits needed to code objects in a sequence of video frames by using shape information to identify transparent transformation blocks around an object and then skipping encoding/decoding of these blocks". (See Lee et al., Column 3, lines 8-12)

However, Lee et al. completely fails to teach or suggest the novel concept of decomposing an input object mask into a plurality of object mask layers and then coding a next higher layer of said plurality of object mask layers in accordance with information from a lower object mask layer. Specifically, Applicant's independent claims 1, 27 and 29 positively recite:

> 1. A method for coding an input object mask, where said input object mask has a plurality of regions, said method comprising the steps of:
> (a) assigning at least one symbol to each of the plurality of regions;
> (b) coding said assigned symbols of the input object mask;
> (c) decomposing said input object mask into a plurality of object mask layers of different spatial resolution;
> (d) coding a base object layer of said plurality of object mask layers; and
> (e) coding a next higher layer of said plurality of object mask layers in accordance with information from a lower object mask layer. (emphasis added)

> 27. A computer-readable medium having stored thereon a plurality of instructions, the plurality of instructions including instructions which, when executed by a processor, cause the processor to perform the steps of a method for coding an input object mask, where said input object mask has a plurality of regions, said method comprising the steps of:
> (a) assigning at least one symbol to each of the plurality of regions;

(b) coding said assigned symbols of the input object mask;

(c) decomposing said input object mask into a plurality of object mask layers of different spatial resolution;

(d) coding a base object layer of said plurality of object mask layers; and

(e) coding a next higher layer of said plurality of object mask layers in accordance with information from a lower object mask layer. (emphasis added)

29. An apparatus for coding an input object mask, where said input object mask has a plurality of regions, said apparatus comprising:

means for assigning at least one symbol to each of the plurality of regions;

a first means for coding said assigned symbols of the input object mask;

means for decomposing said input object mask into a plurality of object mask layers of different spatial resolution;

a second means for coding a base object layer of said plurality of object mask layers; and

a third means for coding a next higher layer of said plurality of object mask layers in accordance with information from a lower object mask layer. (emphasis added)

Applicant's invention teaches a method and apparatus for increasing the efficiency of scalable shape coding by correlating the coding of the mask of the object between different scales. Specifically, in the present invention, a new generic spatially-scalable shape coding method is disclosed that is independent of the mask decomposition scheme. More specifically, with reference to Applicant's Fig. 10, a full-resolution image frame having at least one object is initially segmented into a plurality of blocks or regions. For the purpose of mask generation, each block is assigned a mode or symbol to indicate whether it is "opaque", "transparent" or "border". The modes for the entire mask are then encoded into the bitstream.

Next, the method decomposes the "top level" or full-resolution mask into a plurality of layers or mask levels of different spatial resolution using any shape or mask

decomposition methods, e.g., any of the decomposition methods as discussed in Applicant's FIGs. 2-6. The lowest mask layer, i.e., "base mask layer", is then encoded into the bitstream.

Next, the method hierarchically and contextually encodes mask layers that are above the base mask layer by using information from an immediate lower mask layer. Namely, each layer above the base mask layer (or "enhancement mask layer") is encoded using information that is derived from a mask layer that is immediately below the present mask layer of interest. In this manner, a generic spatially-scalable shape encoding method is provided that is capable of handling different shape or mask decomposition methods, while maximizing coding efficiency of the encoder.

In contrast, Lee et al. is completely devoid of any disclosure as to shape encoding in the context of decomposing an input object mask into a plurality of object mask layers and then coding a next higher layer of said plurality of object mask layers in accordance with information from a lower object mask layer. In fact, Lee et al. states that:

> "In an object-based video encoder or decoder designed according to the invention, shape information is available independent of motion estimation and texture information. As such, the method of the invention can use the shape information to identify transparent transformation blocks and skip texture and possibly motion coding and decoding for these blocks. An encoder employing this method evaluates the shape of an object to determine whether a given block is transparent, i.e. covered by the object. If the block is transparent, the encoder can skip texture coding for inter and intra frame blocks. The encoder can also skip coding of motion estimation data, such as motion vectors or transformation coefficients for inter frame blocks. Similarly, the decoder can use decoded shape information to identify transparent blocks and skip texture or motion decoding for these blocks." (Emphasis added)(See Lee et al., Column 3, lines 13-28)

Thus, Lee et al. is addressing a completely different situation than Applicant's invention. Using shape information to skip blocks is **NOT** using shape invention to provide scalability. More importantly, Lee et al. is completely silent as to Applicant's particular method and apparatus for encoding an object mask.

The Examiner only broadly states that "Lee et al., in Figures 3, 9-11, 16, 20, 35 and 41-43 discloses the same apparatus and method for coding an input object as specified in claims 1, 2 and 27-30 of Applicant's invention". However, Lee et al. states that:

> "FIG. 3A is a generalized functional block diagram of a video compression encoder process for compressing digitized video signals representing display motion in video sequences of multiple image frames. FIG. 3B is a functional block diagram of a master object encoder process."

> "FIG. 9A is a schematic representation of a first pixel block used for identifying corresponding pixels in different image frames. FIG. 9B is a schematic representation of an array of pixels corresponding to a search area in a prior image frame where corresponding pixels are sought. FIGS. 9C-9G are schematic representations of the first pixel block being scanned across the pixel array of FIG. 9B to identify corresponding pixels."

> "FIG. 10A is a schematic representation of a second pixel block used for identifying corresponding pixels in different image frames. FIGS. 10B-10F are schematic representations of the second pixel block being scanned across the pixel array of FIG. 9B to identify corresponding pixels."

> "FIG. 11A is a schematic representation of a third pixel block used for identifying corresponding pixels in different image frames. FIGS. 11B-11F are schematic representations of the third pixel block being scanned across the pixel array of FIG. 9B."

> "FIG. 16 is a simplified fragmentary representation of a display screen showing the image frame of FIG. 7B for purposes of illustrating the transformation block optimization method of FIG. 15."



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> "FIGS. 20A-20D are simplified representations of the color component values of an arbitrary set or array of pixels processed according to the encoder process of FIG. 19A."
>
> "FIG. 35 illustrates how a frame of video can be divided into the objects in the frame."
>
> "FIG. 41 is a flow diagram illustrating a method for skipping transparent macroblocks in an object-based video decoder."
>
> "FIG. 42 is a flow diagram illustrating transparent block skipping for partially covered macroblocks in an object-based video encoder."
>
> "FIG. 43 is a flow diagram illustrating transparent block skipping for partially covered macroblocks in an object-video decoder." (See Lee et al. Column 4, line 1 to Column 6, line 9)

It is respectfully requested that the Examiner point out with specificity as to how these Figures from Lee et al. would anticipate Applicant's invention and then cite the language in Lee et al.'s specification to support such interpretation. Contrary to the Examiner's position, it is clear from the above recitations that Lee et al. in fact does **not** teach Applicant's invention.

Thus, the Applicant respectfully submits that Lee et al. would not anticipate Applicant's invention. As such, Applicant respectfully submits that independent claims 1, 27 and 29 are not anticipated by Lee et al. and, as such, fully satisfy the requirements of U.S.C. § 102 and are patentable thereunder.

Furthermore, dependent claims 2-3, 28, and 30 depend directly or indirectly from claims 1, 27 and 29 and recite additional features therefor. Since Lee et al. fails to teach or suggest claims 1, 27 and 29 of Applicant's invention, Applicant respectfully submits that dependent claims 2-3, 28, and 30 are not anticipated by the teachings of Lee et al. and, as such,

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fully satisfy the requirements of U.S.C. § 102 and are patentable thereunder.

Conclusion

Thus, the Applicant submits that all of these claims now fully satisfy the requirements of 35 U.S.C. §102. Consequently, the Applicant believes that all these claims are presently in condition for allowance. Accordingly, both reconsideration of this application and its swift passage to issue are earnestly solicited.

If, however, the Examiner believes that there are any unresolved issues requiring the issuance of an adverse final action in any of the claims now pending in the application, it is requested that the Examiner telephone Mr. Kin-Wah Tong, Esq. at (732) 530-9404 so that appropriate arrangements can be made for resolving such issues as expeditiously as possible.

Respectfully submitted,

5/20/02

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